(Intro-1) Purpose of NM Integrated Water Management Handbook

Irrigation water management is an integral part of a complete farm management program of soil, water, air, plant, and animal resources. The New Mexico Integrated Water Management Handbook is intended to be user friendly for use by planners with producers. It provides guidance on "how-to" evaluate and understand site-specific field conditions. This will enable an increased understanding needed to evaluate and implement alternative best management practices for irrigation water management. Considering how the farm fits into broader watershed management is also essential to problem-posing and solving resource management success.

The Natural Resources Conservation Service provides technical assistance for producers in all aspects of cropland conservation, including irrigation water management (e.g. installation of irrigation water management practices, water measuring, irrigation scheduling, irrigation system design, reduced cultivation), and nutrient management (e.g. soil, water, and plant nutrient analysis, developing basic nutrient budgets, and determining appropriate fertilizer and manure applications). Other technical assistance areas have included agronomic-related practices and management such as reduced tillage, crop rotations, green manure crops, salinity and pest management, and wildlife conservation.

Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner. The enclosed technical material is designed to provide guidance on "how-to" evaluate and understand site specific field conditions (e.g. based on soil, plant tissue, water and animal waste sampling and analysis, irrigation water management evaluations). The primary purpose of this assessment is to provide an increased understanding needed to evaluate and implement alternative best management practices for irrigation water management within an integrated system, with the end result being a more economical, sustainable, and producer-acceptable farming enterprise.

The New Mexico Integrated Water Management Handbook is intended to be user friendly for use by planners with producers. Therefore, individual producers are strongly advised to work closely with their local chemical consultants, crop consultants, extension specialists, and the Natural Resources Conservation Service on any subject covered in the Handbook. We hope that the Handbook will assist water users in reducing water quantities used, energy use and costs for crop production, and the opportunity for ground and surface water contamination. The greater the understanding we have of our soil, water, and plant resources, the better will be our ability to manage all of our natural resources.

Linda Scheffe, 2008

Potential Benefits of Irrigation Water Management

Water resource:

- Conserves surface and ground water supplies
- Protects surface and ground water quality
- Substantial reduction in irrigation labor costs
- Significant increase in irrigation application efficiencies (higher yields)
- Reduced pumping costs
- Potential detrimental effects of water quality (pH, salinity & sodium) on plants and soils are properly assessed and managed for
- Irrigation water losses through evaporation, runoff and deep percolation are minimized

Soil resource:

- Improved soil quality is possible because of increased biomass production (more crop residues are produced)
- Reduced soil erosion from both water and wind
- Proper assessment, management and prevention of Saline, Saline-Sodic and Sodic soils is attained
- Reduced use of soil amendments
- Reduction in water-logged soils
- Reduced leaching results in higher nitrogen-use efficiency

Plant resource:

- Cost for crop production is reduced due to integration of IWM with nutrient management practices
- Significant increases in yield and crop quality
- Reduced incidences of diseases and pests
- Available water quantity and quality meet the specific requirements of the crop (consumptive use, leaching)

Other:

- Increased beneficial use of fertilizer and soil amendment inputs
- Reduction in over all on-farm energy use
- Protects the environment by the planned judicious use of water, fertilizers and other inputs
- Record keeping is used as an invaluable planning tool in the decision and management of current and future water resources
- All the major aspects involved in the farm operation are integrated in this IWM Handbook
- Analysis of soil, plant/petiole tissue and water samples allows the producer to make informed decisions on all inputs and their relationship to IWM principles
- An effective IWM Plan should be updated to reflect mgmt. changes, learning, etc.

Rudy Garcia 2008

Intro 2

Using Irrigation Water Efficiently

1. Any water applied above that needed to grow a crop is inefficient use of water. Water needed to grow a crop includes the following:

Evapotranspiration (ET) – Water evaporated from the soil and plant surfaces and transpired from vegetation (Also known as Consumptive Use CU), and

Leaching Requirement – The amount of water required to pass through the root zone to reduce salt concentration or prevent salt accumulation in the root zone and sustain or improve production.

2. It is necessary to know efficiency in order to determine the total amount of water to apply. Efficiency is generally expressed by terms that are often used interchangeably, such as application efficiency or irrigation efficiency. They are defined as follows:

Application Efficiency (E_a or AE) – The ratio of the average depth of water infiltrated and stored in the root zone to the amount of water applied. Often used to describe single irrigation events. AE is reduced by runoff, deep percolation, and evaporation.

Irrigation Efficiency (E_i) – The ratio of the average depth of irrigation water beneficially used to the average depth applied, expressed as a percentage. Generally used to express overall field or farm efficiency, or seasonal irrigation efficiency. E_i is reduced by runoff, deep percolation, and evaporation.

3. Many factors can affect efficiency to include the following:

a. Method of application,

b. Levelness of land,

c. Smoothness of land,

d. Application rate,

e. Soil type and condition to also include organic matter,

f. System management,

g. Root zone available water holding capacity at time of application, and

h. Distribution Uniformity

Applying more water than the amount needed to fill the root zone and fulfill the leaching requirement will not benefit the crop.

(Intro – 3) NRCS Strategic Plan & Student IWM Class Presentation Format

NRCS Strategic Plan 2005 - 2010

VISION:

- **Productive Lands—Healthy Environment**

MISSION:

- **Helping People Help the Land**

MISSION GOALS & OUTCOMES:
Soil, Water, Air, Plants, Animals, Humans & Energy (SWAPAH-e)

- **High Quality, Productive Soils (Soil Quality)**
- **Clean and Abundant Water (Water Quality & Water Management)**
- **Clean Air (Carbon Sequestration)**
- **Healthy Plant and Animal Communities**
- **Working Farm and Ranch Lands (Connected landscapes sustain a viable agriculture and natural resource quality)**
- **An Adequate Energy Supply (Agricultural activities conserve energy)**

OVERARCHING STRATEGIES:

- **Cooperative Conservation (We will seek and promote cooperative efforts to achieve natural resource goals)**
- **Watershed Approach (We will provide information and assistance to encourage and enable locally led, watershed-scale conservation efforts)**
- **Market-based Approach (We will facilitate growth of market-based opportunities that encourage the private sector to invest in conservation on private lands)**

Group Presentation Instructions:

- **One-half hour presentation/group (4-students per group; one being the lead)**
- **Two topics per student (taken from the Mission Goals & Outcomes and/or Overarching Strategies); 7-min./student. Lead will cover 3-topics (9-min.)**
- **One-hour allotted for preparing group presentations and to post the results on flip chart before presentations are given**
- **Lead will coordinate all presentations and strategy.**
- **Emphasize your main points in bullet format (circle topics covered)**

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